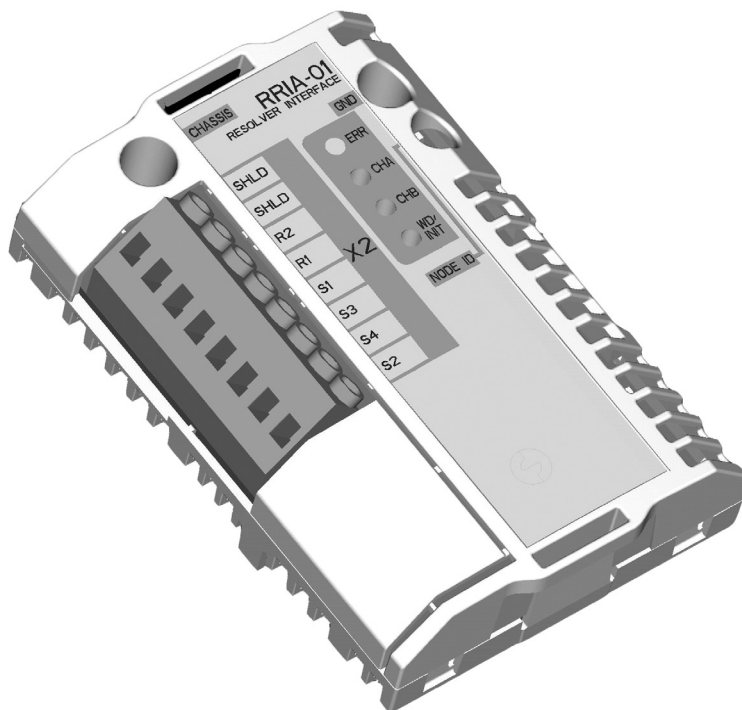


ABB Drives

User's Manual Resolver Interface Module RRIA-01



Resolver Interface Module
RRIA-01

User's Manual

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Safety instructions

Overview

This chapter states the general safety instructions that must be followed when installing and operating the RRIA-01 Resolver Interface module.

The material in this chapter must be studied before attempting any work on, or with, the unit.

In addition to the safety instructions given below, read the complete safety instructions of the specific drive you are working on.

General safety instructions



WARNING! All electrical installation and maintenance work on the drive should be carried out by qualified electricians.

The drive and adjoining equipment must be properly earthed.

Do not attempt any work on a powered drive. After switching off the mains, always allow the intermediate circuit capacitors 5 minutes to discharge before working on the frequency converter, the motor or the motor cable. It is good practice to check (with a voltage indicating instrument) that the drive is in fact discharged before beginning work.

The motor cable terminals of the drive are at a dangerously high voltage when mains power is applied, regardless of motor operation.

There can be dangerous voltages inside the drive from external control circuits even when the drive mains power is shut off. Exercise appropriate care when working on the unit. Neglecting these instructions can cause physical injury or death.

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Introduction

Intended audience

The manual is intended for the people who are responsible for commissioning and using an RRIA-01 Resolver Interface module with the ACS800 drive. The reader is expected to have a basic knowledge of electrical fundamentals, electrical wiring practices and how to operate the drive.

Before you start

It is assumed that the drive is installed and ready to operate before starting the installation of the extension module.

In addition to conventional installation tools, have the drive manuals available during the installation as they contain important information not included in this manual. The drive manuals are referred to at various points of this document.

What this manual contains

This manual contains information on the wiring, configuration and use of the RRIA-01 module.

Safety instructions are featured in the first few pages of this manual.

Overview contains a short description of the RRIA-01 Resolver Interface module, a delivery checklist and warranty information.

Installation contains instructions for module hardware settings, mounting and cabling.

Fault tracing explains fault tracing and the LED indications of the RRIA-01 module.

Technical data contains information on the physical dimensions, configurable settings, and connectors of the module.

Overview

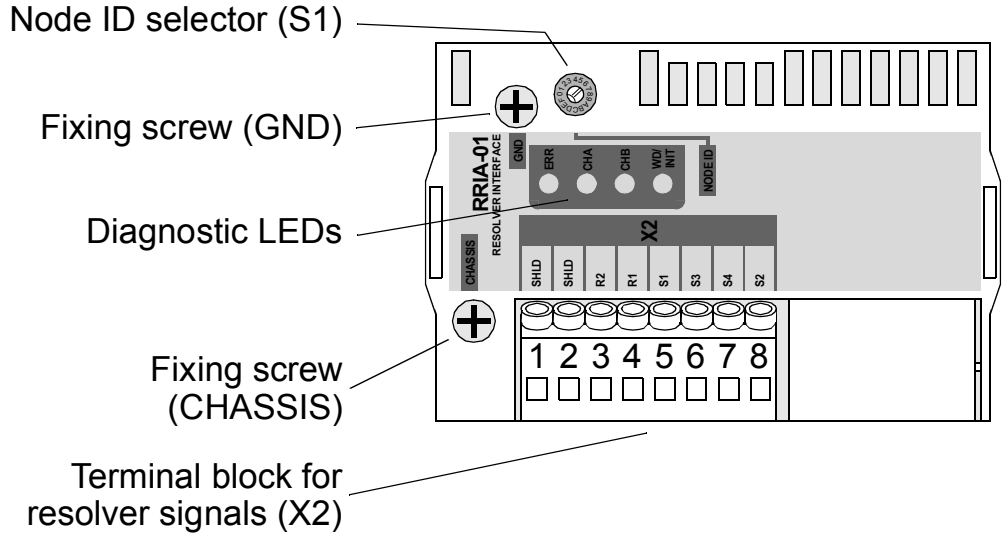
Overview

This chapter contains a short description of the RRIA-01 Resolver Interface module and a delivery checklist.

The RRIA-01 module

The RRIA-01 Resolver Interface module offers an interface for an analogue resolver connection. A resolver is used to obtain accurate speed or position (angle) feedback from the motor shaft.

Module layout



Delivery check

The option package contains:

- RRIA-01 module
- Two screws (M3×8 mm)
- This manual.

Compatibility

The RRIA-01 is compatible with

- ACS800 Motion Control Application Program version APXR7000 or later,
- ACS800 Permanent Magnet Synchronous Machine Drive Application Program for Standard Application Program version AQPM7040 or later, and
- ACS800 Permanent Magnet Synchronous Machine Drive Application Program for System Application Program version ANXR7100 or later.

Installation



WARNING! Follow the safety instructions given in this guide and the drive manuals.

Mounting

The RRIA-01 is to be inserted into the position marked SLOT 1 or SLOT 2 on the drive. The module is held in place with plastic retaining clips and two screws. The screws also provide the earthing of the I/O cable shield connected to the module, and interconnect the GND signals of the module and the RMIO board.

On installation of the module, the signal and power connection to the drive is automatically made through a 38-pin connector.

The module can alternatively be mounted on a DIN rail-mountable AIMA-01 I/O Module Adapter.

Mounting procedure:

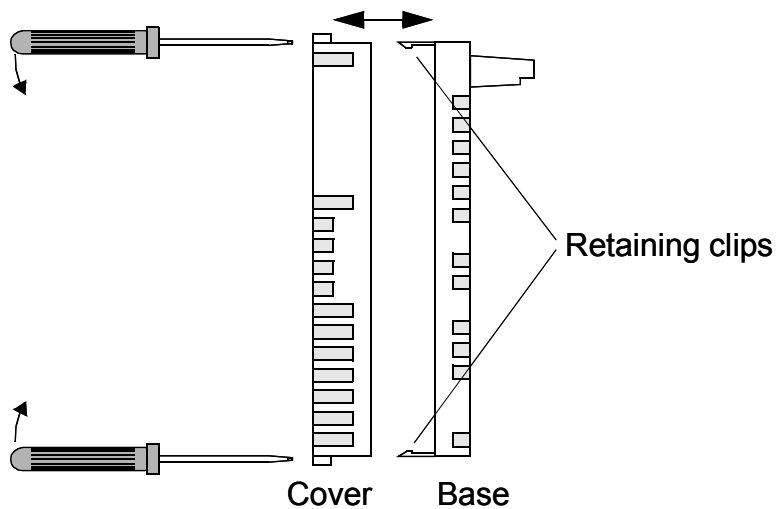
1. Insert the module carefully into SLOT 1 or SLOT 2 on the RMIO board until the retaining clips lock the module into position.
2. Fasten the two screws (included) to the stand-offs.

Note: Correct installation of the screws is essential for fulfilling the EMC requirements and for proper operation of the module.

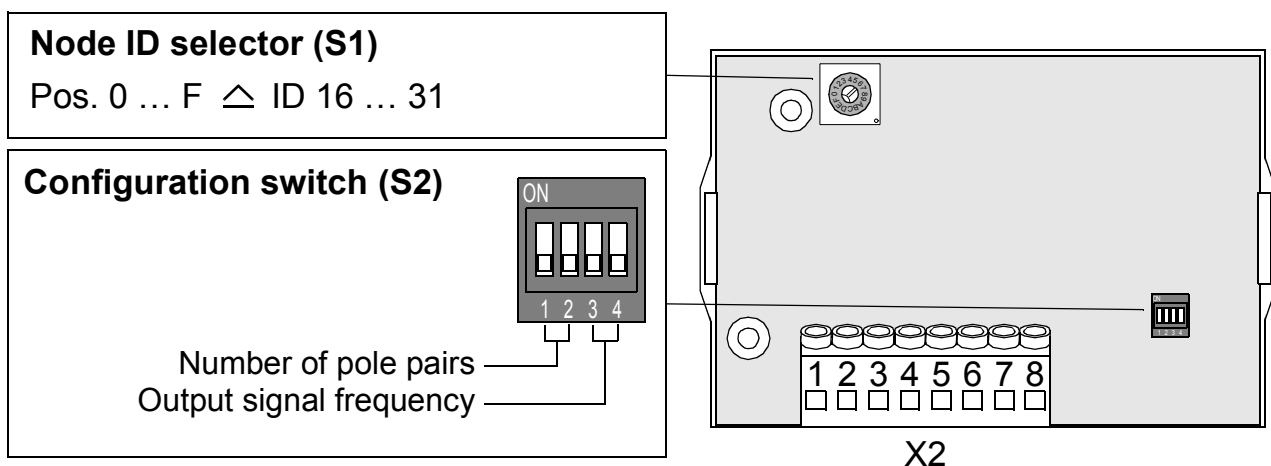
Removing and refitting the cover of the enclosure

To make the necessary DIP switch settings, the cover of the module enclosure must be removed. This can be done by carefully bending the two cover retaining clips with a small screwdriver and lifting the cover off.

Refit the cover by pushing it back into its place until the retaining clips lock it into position.

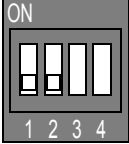
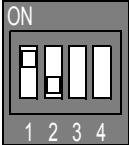
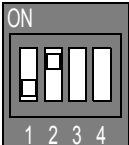
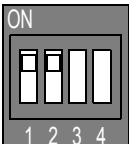


Switches



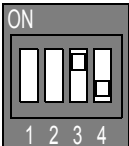
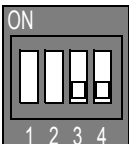
Setting the number of pole pairs

The number of pole pairs of the resolver is to be set using switch S2 as follows:

Number of pole pairs	DIP switch setting
1	
2	
3	
4	

Setting the excitation frequency

The resolver excitation frequency is to be selected using switch S2 as follows:

Excitation frequency	DIP switch setting
10 kHz	
20 kHz	

Terminal designations

X2	Marking	Description
1	SHLD	For earthing of the resolver cable shields. Internally connected to the frame.
2	SHLD	
3	R2	Excitation voltage Frequency: 10 or 20 kHz (selected by DIP switch S2:3 and S2:4 – see section “ <i>Setting the excitation frequency</i> ” above) Maximum output voltage: 12 V _{pp} Outputs and inputs are isolated from the logic, and the power supply For a resolver recommendation, see page 24.
4	R1	Output common. Connected via an RC filter to the frame.
5	S1	Cosine winding input 1
6	S3	Cosine winding input 2
7	S4	Sine winding input 1
8	S2	Sine winding input 2

Resolver wiring

General

The resolver should be connected to the RRIA-01 module with a cable specified below.

Cable construction	4 × (2+1) Twisted pair cable with individual and overall shields.
Conductor cross-sectional area	0.5 to 1.0 mm ²
Maximum cable length	100 m

Note: The cable shields should be earthed only at the RRIA module if the resolver is not isolated from the motor and earth. However, if the resolver is isolated from the motor and earth, the cable shields are to be connected to the resolver housing also.

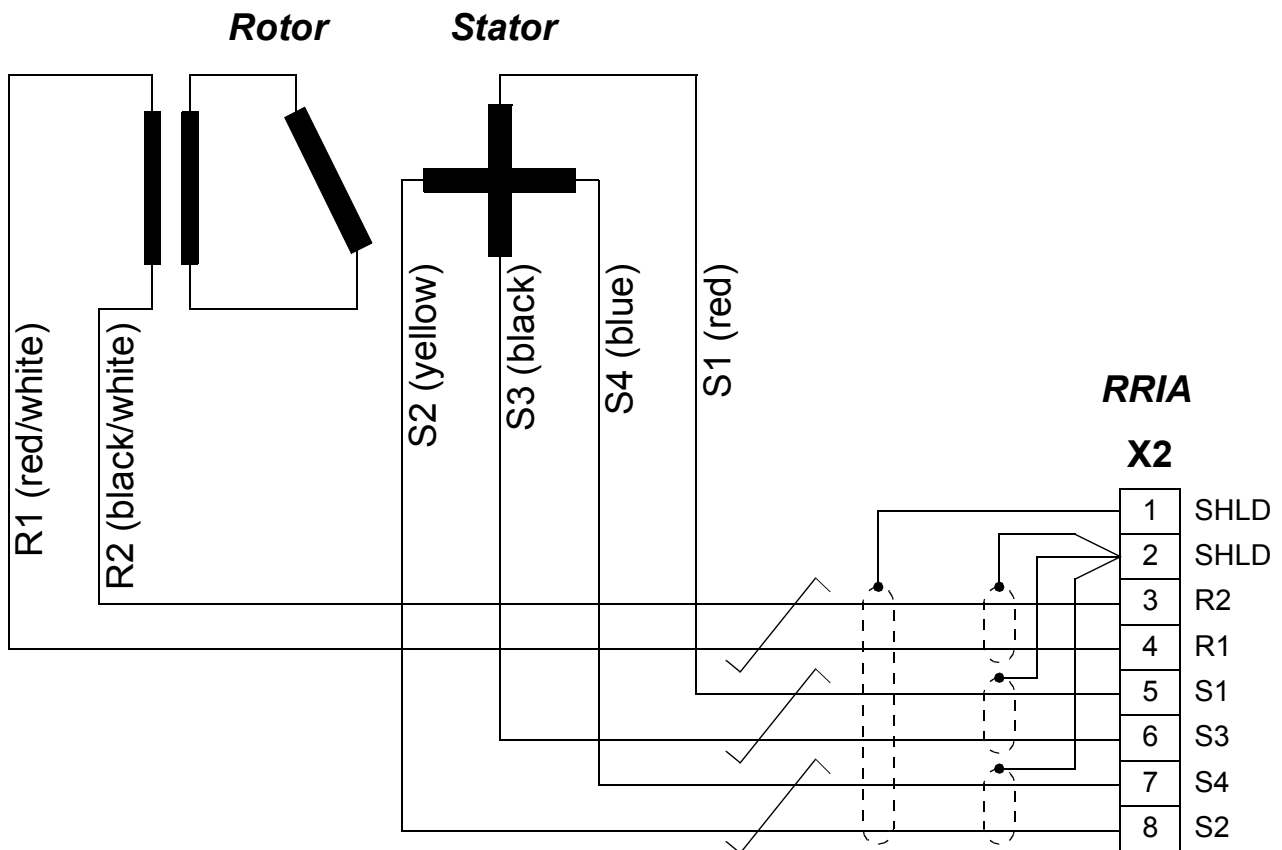
Note: Do not route the resolver cables parallel to power (eg. motor) cables.

Phasing

When the resolver is connected correctly, running the drive in the *Forward* (positive speed reference) direction should produce a positive resolver speed feedback.

Wiring diagram

Note: The wire colours given apply to common types of resolver. Check the correct wiring with the resolver documentation.



Node address selection

Setting the node ID is not required when the module is mounted into SLOT 1 or SLOT 2 on the drive.

If the RRIA-01 module is mounted onto external I/O Module Adapter AIMA-01, choose the proper node ID for the module using the node ID selector (S1).

The settings 0 ... F correspond to node IDs 16 ... 31. The default setting is 0 (node ID 16).

Programming

The RRIA-01 is programmed through drive parameters. These parameters must be checked and adjusted. For further information, see the drive *Firmware Manual*, Parameter Groups 50 and 98.

Fault tracing

Diagnostic LEDs

There are four diagnostic LEDs on the RRIA-01 module.

CHA, CHB (Green)

These LEDs show the activity on channels A and B as generated from the resolver output signal.

WD/INIT (Yellow)

This LED shows the status of the module. The LED is lit when the drive is configuring the module at power-up. It can also be lit after power-up if an error occurs in the communication between the drive and the RRIA-01 (see *Option slot installation* below).

ERR (Red)

This LED lights when the module receives an abnormal signal from the resolver, indicating one of the following:

- Loss of excitation signal (R1 and R2). Possible causes:
 - Bad connection or short-circuit in the wiring
 - Failure of the excitation circuit of the RRIA-01 module.
- Loss of resolver signal (S1 to S4) because of a bad connection, or a short-circuit between the S1-S3 and S2-S4 lines during rotation.

The ERR LED is also lit in case of an error is encountered during the internal self-test of the module.

Installation problems

Option slot installation

In case the WD/INIT LED does not go out after about 5 seconds:

- The configuration has failed.
 - Cycle the power supply of the drive.
- The module has a hardware failure.
 - Ensure the 38-pin connector is properly inserted.
 - Contact an ABB service representative.

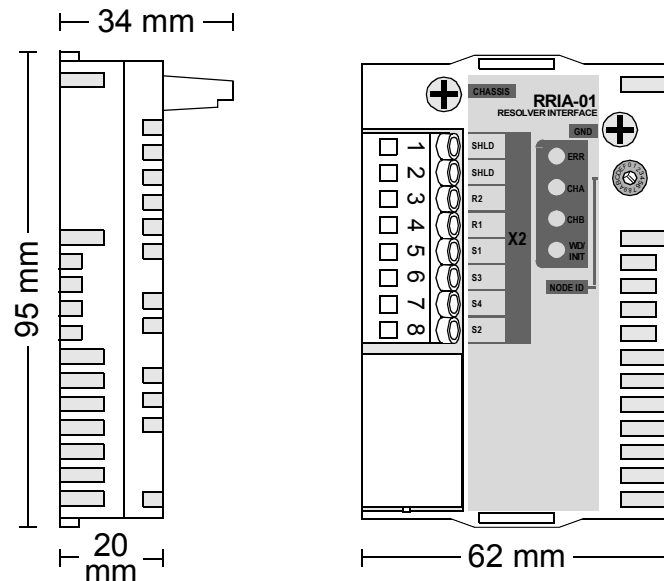
AIMA-01 I/O Module Adapter installation

- There is no communication with the drive.
 - Check that the drive is powered.
 - Check the module node ID.
 - Ensure the 38-pin connector is properly inserted.
 - Check the parameter settings of the drive.
 - Contact an ABB service representative.

Technical data

RRIA-01 data

Dimensions:



Mounting: Into an option slot of the RMIO board of the drive or onto external I/O Module Adapter (AIMA-01).

Degree of protection: IP20

Ambient conditions: The applicable ambient conditions specified for the drive in its *Hardware Manual* are in effect.

Hardware settings: Rotary switch for node ID selection (range 16...31)

Connectors:

- 38-pin parallel bus connector
- One 8-pole non-detachable screw-type terminal block for max. 2.5 mm² wire.

Max. power consumption: 180 mA (5 V) + 80 mA (24 V)

Estimated min. lifetime: 100 000 h

Resolver interface:

- Signal levels:
- Output: 12 V_{pp} at 10 or 20 kHz AC
- Inputs: 8 V_{pp} at 10 or 20 kHz
- Frequency: 20 kHz (max.)
- Position feedback resolution: 0.024% (12 bits)
- Maximum resolver cable length: 100 m
- Isolated from the logic and earth. Test voltage: 1.5 kV AC, 1 minute

Miscellaneous:

- All materials UL/CSA-approved
- Complies with EMC standards EN 50081-2 and EN 50082-2

Resolver recommendation

Input voltage and frequency: 7 V rms, 10 kHz

Transformation ratio: $0.5 \pm 5\%$

Impedance:

- Between R1 and R2 with open outputs (Z_{RO}): 190 ohms
- Between R1 and R2 with short circuits between S1 and S3 as well as between S2 and S4 (Z_{RS}): –
- Between S2 and S4 in a position of 0° (minimal coupling) with open outputs (Z_{SO}): 300 ohms
- Between S1 and S3 in a position of 0° (maximal coupling) with short circuits between R1 and R2 (Z_{SS}): 270 ohms



ABB Oy

AC Drives

P.O. Box 184

FIN-00381 HELSINKI

FINLAND

Telephone +358 10 22 11

Fax +358 10 22 22681

Internet <http://www.abb.com>

ABB Inc.

Automation Technologies

Drives & Motors

16250 West Glendale Drive

New Berlin, WI 53151

USA

Telephone 262 785-3200

800-HELP-365

Fax 262 780-5135

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